

AMENDMENT TO THE CLAIMS

A listing of the claims presented in this patent application appears below. This listing replaces all prior versions and listing of claims in this patent application.

Claim 1 (canceled).

Claim 2 (previously amended): The varnish composition of claim 23 wherein the polymer ingredient contains 10 to 99.8% by weight of the polyamic acid B represented by formula (1), and 0.2 to 90% by weight of the combination of the polyamic acid A represented by formula (2) and the N-substituted polyamide represented by formula (3), based on the total amount of the polymer ingredient.

Claim 3 (previously amended): The varnish composition of claim 23 wherein the polymer ingredient contains the polyamic acid B represented by formula (1) in the range of 40 to 98% by weight, the polyamic acid A represented by formula (2) and the N-substituted polyamide represented by formula (3), in the range of 1 to 59% by weight respectively, based on the total amount of the polymer ingredient.

Claim 4 (previously amended): The varnish composition of any one of claims 23, 2 or 3 wherein R¹ in the formula (1) contains as an essential component a tetravalent organic radical derived from alicyclic tetracarboxylic acids.

Claim 5 (previously amended): The varnish composition of any one of claims 23, 2 or 3 wherein R¹ in the formula (1) contains 10 to 100 mole % of a tetravalent organic radical of an alicyclic system, based on the total amount of the tetravalent organic radical R¹ derived from

tetracarboxylic acids, and R^2 contains as a main component at least one of radicals represented by formula (4):



wherein X represents a single bond, CH_2 , CH_2CH_2 , $\text{CH}_2\text{CH}_2\text{CH}_2$, $\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2$, or $\text{C}(\text{CH}_3)_2$, R^9 and R^{10} each independently represent hydrogen or a lower alkyl group, a and b are individually 1 to 2, and o is 0 to 3, provided that when o is 2 to 3, and each X may be the same or different from each other.

Claim 6 (previously amended): The varnish composition of any one of claims 23, 2 or 3 wherein R^1 in formula (1) contains 10 to 100 mole % of a tetravalent radical derived from cyclobutane tetra-carboxylic acids, based on the total amount of the tetravalent organic radical R^1 derived from tetracarboxylic acids, and R^2 contains as a main component at least one of radicals selected from divalent radicals derived from 4,4'-diaminodiphenylmethane, 4,4'-diaminodiphenylethane, 1,4-bis[2-(4-aminophenyl)ethyl]benzene, 1,4-bis(4-aminophenylmethyl)benzene, 1,3-bis[4-(4-aminophenylmethyl)phenyl]propane, or bis[4-(4-aminophenylmethyl)phenyl]methane.

Claim 7 (previously amended): The varnish composition of any one of claims 23, 2 or 3 wherein $R^{1'}$ in formula (2) contains as an essential component a tetravalent organic radical derived from aromatic or/and alicyclic or/and aliphatic tetracarboxylic acids.

Claim 8 (original): The varnish composition of claim 7 wherein $R^{2'}$ in formula (2) is a divalent organic radical having a side chain group of not less than 3 carbon atoms and the content of the radical is 1 to 100 mole% based on the total amount of the divalent organic radical $R^{2'}$,

Claim 9 (canceled).

Claim 10 (previously amended): The varnish composition of any one of claims 23, 2 or 3 wherein R^3 in formula (3) contains as a main component a divalent organic radical derived from aromatic or/and alicyclic or/and aliphatic dicarboxylic acids, R^4 contains as a main component a divalent organic radical derived from aromatic or/and alicyclic or/and aliphatic diamines, R^5 and R^6 represent a monovalent organic radical or hydrogen in which a percentage of the substitution of the monovalent organic radical is not less than 50%, the organic radical may be plural species, and at least one of R^3 , R^4 , R^5 , or R^6 is a radical having a side chain group of not less than 3 carbon atoms, and n is a natural number.

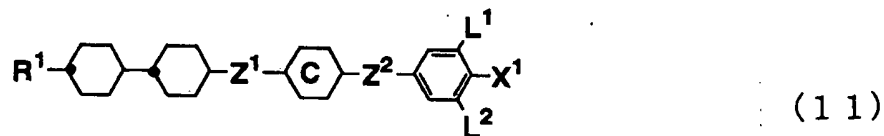
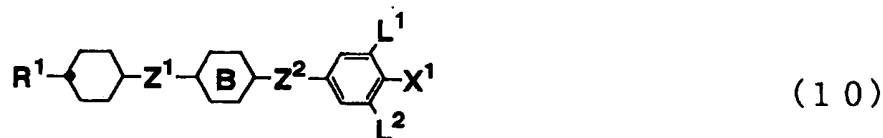
Claim 11 (original): The varnish composition of claim 10 wherein R^4 in formula (3) is a diamine radical having a side chain group of not less than 3 carbon atoms, the content of which is 1 to 100 mole% based on the total amount of the diamine radicals R^4 , and R^5 and R^6 represent the monovalent organic radical, the percentage of the substitution of which is not less than 70%.

Claim 12 (canceled).

Claim 13 (previously amended): A varnish composition for a liquid crystal aligning film defined in any one of claims 23, 2 or 3.

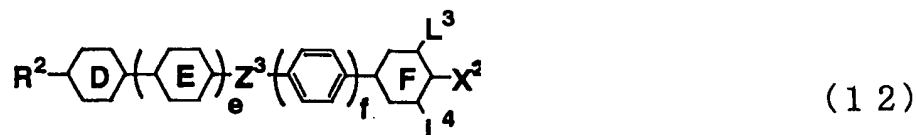
Claim 14 (original): A liquid crystal display element using a varnish composition defined in claim 13.

Claim 15 (previously amended): A liquid crystal display element wherein a liquid crystal composition containing at least one of liquid crystalline compounds represented by formulas (9), (10) and (11) is applied to the liquid crystal display element defined in claim 14:



wherein R^1 represents an alkyl group of 1-10 carbon atoms in which any non-adjacent methylene may be replaced by $-\text{O}-$ or $-\text{CH}=\text{CH}-$ in which any hydrogen may be replaced by fluorine; X^1 represents fluorine, chlorine, $-\text{OCF}_3$, $-\text{OCF}_2\text{H}$, $-\text{CF}_3$, $-\text{CF}_2\text{H}$, $-\text{CFH}_2$, $-\text{OCF}_2\text{CF}_2\text{H}$, or $-\text{OCF}_2\text{CFHCF}_3$; L^1 and L^2 each independently represent hydrogen or fluorine; Z^1 and Z^2 each independently represent 1,2-ethylene, 1,4-butylene, $-\text{COO}-$, $-\text{CF}_2\text{O}-$, $-\text{OCF}_2-$, $-\text{CH}=\text{CH}-$, or a single bond; ring B represents trans-1,4-cyclohexylene, 1,3-dioxane-2,5-diyl or 1,4-phenylene in which hydrogen may be replaced by fluorine; ring C represents trans-1,4-cyclohexylene or 1,4-phenylene in which hydrogen may be replaced by fluorine.

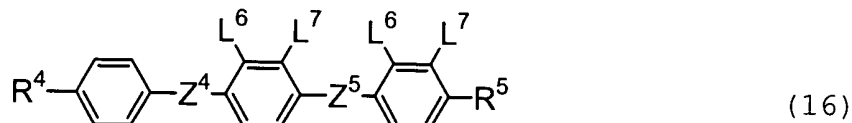
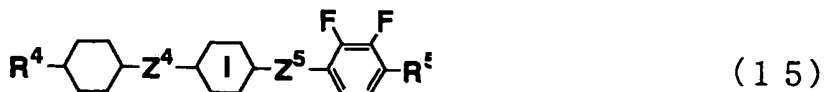
Claim 16 (previously amended): A liquid crystal display element wherein a liquid crystal composition containing at least one of liquid crystalline compounds represented by formulas (12) and (13) is applied to the liquid crystal display element defined in claim 14:



wherein R² and R³ each independently represent an alkyl group of 1 to 10 carbon atoms in which any non-adjacent methylene may be replaced by -O- or -CH=CH- in which any hydrogen may be replaced by fluorine; X² represents -CN or -C≡C-CN; ring D represents trans-1,4-cyclohexylene, 1,4-phenylene, 1,3-dioxane-2,5-diyl, or pyrimidine-2,5-diyl; ring E represents trans-1,4-cyclohexylene, pyrimidine-2,5-diyl or 1,4-phenylene in which hydrogen may be replaced by fluorine; ring F represents trans-1,4-cyclohexylene or 1,4-phenylene, Z³ represents 1,2-ethylene, -COO- or a single bond; L³, L⁴ and L⁵ each independently represent hydrogen or fluorine; e, f and g each independently represent 0 or 1.

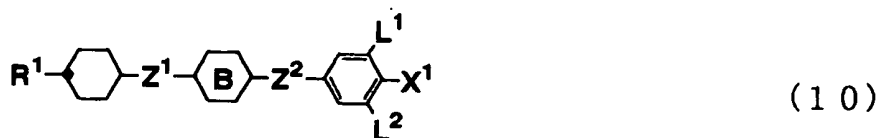
Claim 17 (previously amended): A liquid crystal display element wherein a liquid crystal composition containing at least one of liquid crystalline compounds represented by formulas (14), (15) and (16) is applied to the liquid crystal display element defined in claim 14:





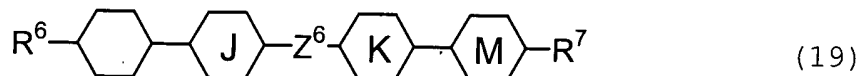
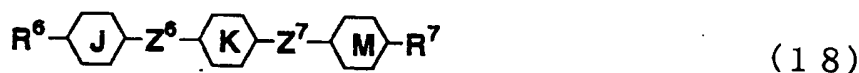
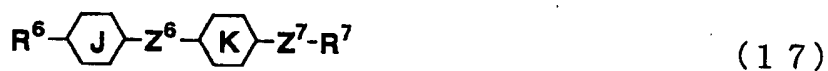
wherein R^4 and R^5 each independently represent an alkyl group of 1 to 10 carbon atoms in which any non-adjacent methylene may be replaced by $-O-$ or $-\text{CH}=\text{CH}-$ and any hydrogen may be replaced by fluorine; rings G and I each independently represent trans-1,4-cyclohexylene or 1,4-phenylene; L^6 and L^7 each independently represent hydrogen or fluorine, but does not represent hydrogen at the same time; Z^4 and Z^5 each independently represent 1,2-ethylene, $-\text{COO}-$ or a single bond.

Claim 18 (previously amended): A liquid crystal display element wherein a liquid crystal composition containing as a first component at least one of liquid crystalline compounds represented by formulas (9), (10) and (11):



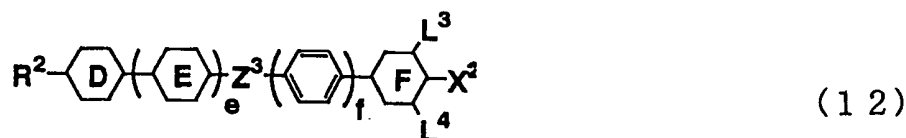
wherein R^1 represents an alkyl group of 1-10 carbon atoms in which any non-adjacent methylene may be replaced by $-O-$ or $-\text{CH}=\text{CH}-$ in which any hydrogen may be replaced by fluorine; X^1 represents fluorine, chlorine, $-\text{OCF}_3$, $-\text{OCF}_2\text{H}$, $-\text{CF}_3$, $-\text{CF}_2\text{H}$, $-\text{CFH}_2$, $-\text{OCF}_2\text{CF}_2\text{H}$, or $-\text{OCF}_2\text{CFHCF}_3$; L^1 and L^2 each independently represent hydrogen or fluorine; Z^1 and Z^2 each independently represent 1,2-ethylene, 1,4-butylene, $-\text{COO}-$, $-\text{CF}_2\text{O}-$, $-\text{OCF}_2-$, $-\text{CH}=\text{CH}-$, or a single bond; ring B represents trans-1,4-cyclohexylene, 1,3-dioxane-2,5-diyl or 1,4-phenylene in which hydrogen may be replaced by fluorine; ring C represents trans-1,4-cyclohexylene or 1,4-phenylene in which hydrogen may be replaced by fluorine; and

as a second component at least one of liquid crystalline compounds represented by formulas (17), (18) and (19) is applied to the liquid crystal display element defined claim 14:



wherein R^6 and R^7 each independently represent an alkyl group of 1 to 10 carbon atoms in which any non-adjacent methylene may be replaced by $-O-$ or $-\text{CH}=\text{CH}-$ and any hydrogen may be replaced by fluorine; ring J, ring K and ring M each independently represent trans-1,4-cyclohexylene, pyrimidine-2,5-diyl or 1,4-phenylene in which hydrogen may be replaced by fluorine; and Z^6 and Z^7 each independently represent 1,2-ethylene, $-\text{C}\equiv\text{C}-$, $-\text{COO}-$, $-\text{CH}=\text{CH}-$ or a single bond.

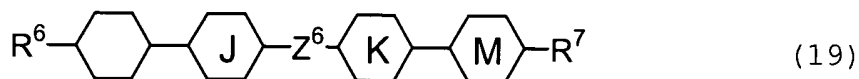
Claim 19 (previously amended): A liquid crystal display element wherein a liquid crystal composition containing as a first component at least one of liquid crystalline compounds represented by formulas (12) and (13):



wherein R^2 and R^3 each independently represent an alkyl group of 1 to 10 carbon atoms in which any non-adjacent methylene may be replaced by ---O--- or ---CH=CH--- in which any hydrogen may be replaced by fluorine; X^2 represents ---CN or $\text{---C}\equiv\text{C---CN}$; ring D represents trans-1,4-cyclohexylene, 1,4-phenylene, 1,3-dioxane-2,5-diyl, or pyrimidine-2,5-diyl; ring E represents trans-1,4-cyclohexylene, pyrimidine-2,5-diyl or 1,4-phenylene in which hydrogen may be replaced by fluorine; ring F represents trans-1,4-cyclohexylene or 1,4-phenylene, Z^3 represents 1,2-ethylene, ---COO--- or a single bond; L^3 , L^4 and L^5 each independently represent hydrogen or fluorine; e, f and g each independently represent 0 or 1; and

as a second component at least one of liquid crystalline compounds represented by formulas (17), (18) and (19):

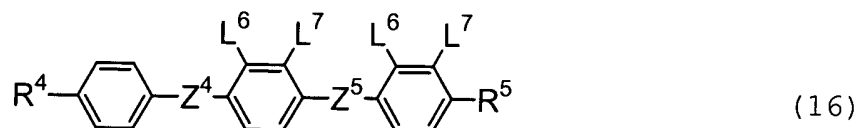
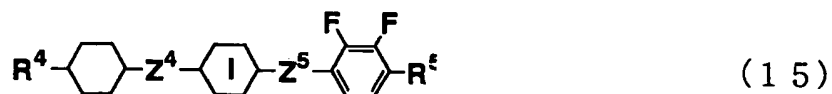
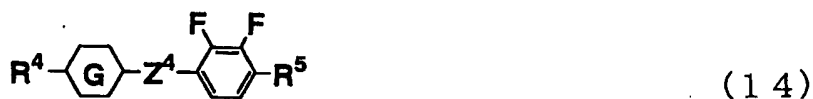




wherein R^6 and R^7 each independently represent an alkyl group of 1 to 10 carbon atoms in which any non-adjacent methylene may be replaced by $-O-$ or $-\text{CH}=\text{CH}-$ and any hydrogen may be replaced by fluorine; ring J, ring K and ring M each independently represent trans-1,4-cyclohexylene, pyrimidine-2,5-diyl or 1,4-phenylene in which hydrogen may be replaced by fluorine; and Z^6 and Z^7 each independently represent 1,2-ethylene, $-\text{C}\equiv\text{C}-$, $-\text{COO}-$, $-\text{CH}=\text{CH}-$ or a single bond;

is applied to the liquid crystal display element defined in claim 14.

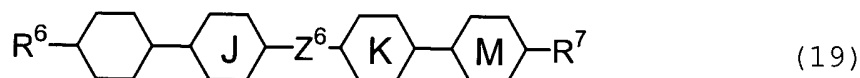
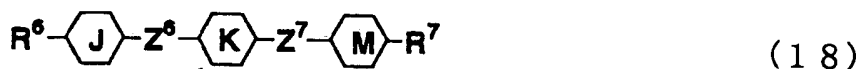
Claim 20 (previously amended): A liquid crystal display element wherein a liquid crystal composition containing as a first component at least one of liquid crystalline compounds represented by formulas (14), (15) and (16):



wherein R^4 and R^5 each independently represent an alkyl group of 1 to 10 carbon atoms in which any non-adjacent methylene may be replaced by $-O-$ or $-\text{CH}=\text{CH}-$ and any hydrogen may be replaced by fluorine; rings G and I each independently represent trans-1,4-cyclohexylene or 1,4-phenylene; L^6 and L^7 each independently represent hydrogen or fluorine, but does not represent

hydrogen at the same time; Z^4 and Z^5 each independently represent 1,2-ethylene, $-\text{COO}-$ or a single bond; and

as a second component at least one of liquid crystalline compounds represented by formulas (17), (18) and (19):

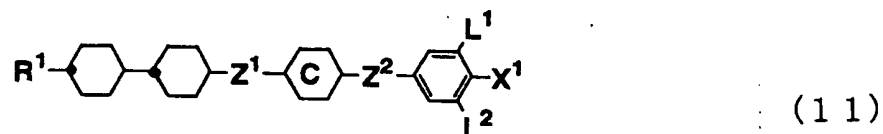
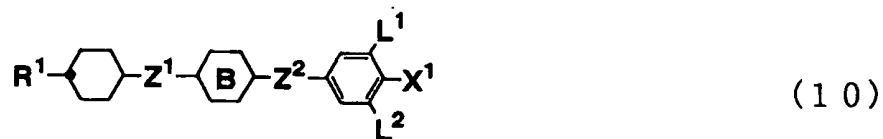


wherein R^6 and R^7 each independently represent an alkyl group of 1 to 10 carbon atoms in which any non-adjacent methylene may be replaced by $-\text{O}-$ or $-\text{CH}=\text{CH}-$ and any hydrogen may be replaced by fluorine; ring J, ring K and ring M each independently represent trans-1,4-cyclohexylene, pyrimidine-2,5-diyl or 1,4-phenylene in which hydrogen may be replaced by fluorine; and Z^6 and Z^7 each independently represent 1,2-ethylene, $-\text{C}\equiv\text{C}-$, $-\text{COO}-$, $-\text{CH}=\text{CH}-$ or a single bond;

is applied to the liquid crystal display element defined in claim 14.

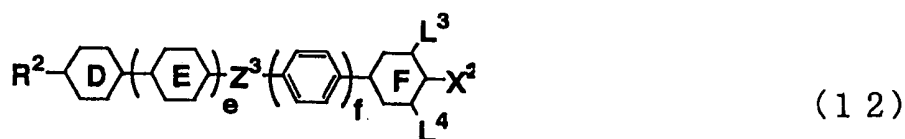
Claim 21 (previously amended): A liquid crystal display element wherein a liquid crystal composition containing as a first component at least one of liquid crystalline compounds represented by formulas (9), (10) and (11):





wherein R^1 represents an alkyl group of 1-10 carbon atoms in which any non-adjacent methylene may be replaced by $-\text{O}-$ or $-\text{CH}=\text{CH}-$ in which any hydrogen may be replaced by fluorine; X^1 represents fluorine, chlorine, $-\text{OCF}_3$, $-\text{OCF}_2\text{H}$, $-\text{CF}_3$, $-\text{CF}_2\text{H}$, $-\text{CFH}_2$, $-\text{OCF}_2\text{CF}_2\text{H}$, or $-\text{OCF}_2\text{CFHCF}_3$; L^1 and L^2 each independently represent hydrogen or fluorine; Z^1 and Z^2 each independently represent 1,2-ethylene, 1,4-butylene, $-\text{COO}-$, $-\text{CF}_2\text{O}-$, $-\text{OCF}_2-$, $-\text{CH}=\text{CH}-$, or a single bond; ring B represents trans-1,4-cyclohexylene, 1,3-dioxane-2,5-diyl or 1,4-phenylene in which hydrogen may be replaced by fluorine; ring C represents trans-1,4-cyclohexylene or 1,4-phenylene in which hydrogen may be replaced by fluorine;

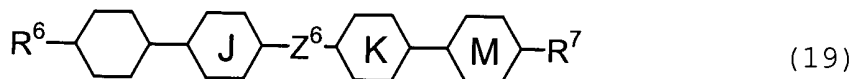
as a second component at least one of liquid crystalline compounds represented by formulas (12) and (13):



wherein R^2 and R^3 each independently represent an alkyl group of 1 to 10 carbon atoms in which any non-adjacent methylene may be replaced by $-\text{O}-$ or $-\text{CH}=\text{CH}-$ in which any hydrogen may be replaced by fluorine; X^2 represents $-\text{CN}$ or $-\text{C}\equiv\text{C}-\text{CN}$; ring D represents trans-1,4-cyclohexylene, 1,4-phenylene, 1,3-dioxane-2,5-diyl, or pyrimidine-2,5-diyl; ring E represents

trans-1,4-cyclohexylene, pyrimidine-2,5-diyl or 1,4-phenylene in which hydrogen may be replaced by fluorine; ring F represents trans-1,4-cyclohexylene or 1,4-phenylene, Z^3 represents 1,2-ethylene, $-\text{COO}-$ or a single bond; L^3 , L^4 and L^5 each independently represent hydrogen or fluorine; e, f and g each independently represent 0 or 1; and

as a third component at least one of liquid crystalline compounds represented by formulas (17), (18) and (19):

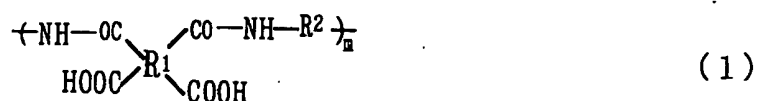


wherein R^6 and R^7 each independently represent an alkyl group of 1 to 10 carbon atoms in which any non-adjacent methylene may be replaced by $-\text{O}-$ or $-\text{CH}=\text{CH}-$ and any hydrogen may be replaced by fluorine; ring J, ring K and ring M each independently represent trans-1,4-cyclohexylene, pyrimidine-2,5-diyl or 1,4-phenylene in which hydrogen may be replaced by fluorine; and Z^6 and Z^7 each independently represent 1,2-ethylene, $-\text{C}\equiv\text{C}-$, $-\text{COO}-$, $-\text{CH}=\text{CH}-$ or a single bond;

is applied to the liquid crystal display element defined in claim 14.

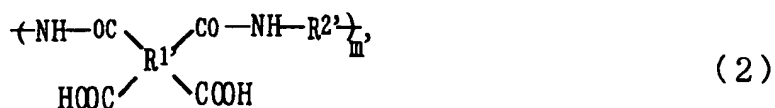
Claim 22 (canceled).

Claim 23 (previously added): A varnish composition which comprises:
a polymer ingredient containing polyamic acid B represented by formula (1):



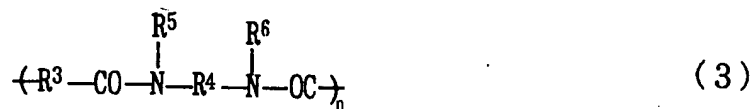
wherein R^1 is a tetravalent organic radical derived from tetracarboxylic acids, and R^2 is a divalent organic radical derived from diamines, and m is a natural number;

a polyamic acid A represented by formula (2), having a side chain of not less than 3 carbon atoms:



wherein R^1 is a tetravalent organic radical derived from tetracarboxylic acids, R^2 is a divalent organic radical derived from diamines, at least one of the tetravalent and divalent organic radicals has a side chain of not less than 3 carbon atoms, and m is a natural number;

an N-substituted polyamide represented by formula (3):



wherein R^3 is a divalent organic radical derived from dicarboxylic acids; R^4 is a divalent organic radical derived from diamines; R^5 and R^6 represent a monovalent organic radical or hydrogen in which the percentage of the substitution of the monovalent organic radical is not less than 30% and the organic radical may be plural species, and n is a natural number; and

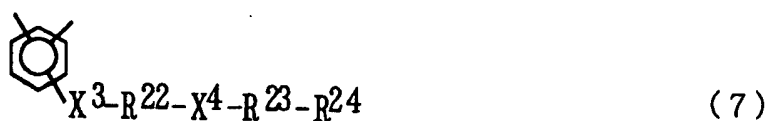
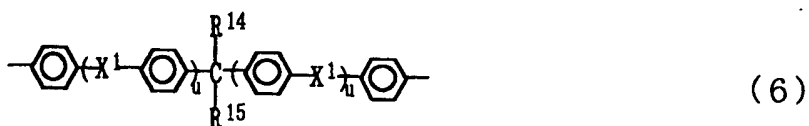
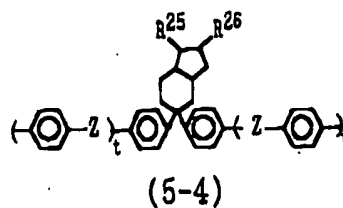
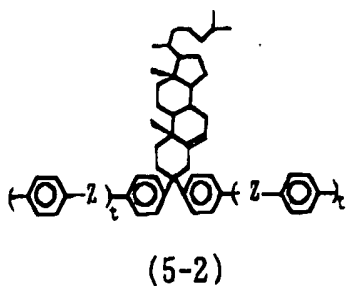
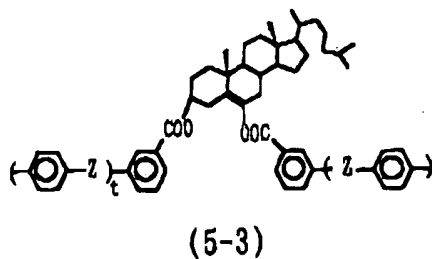
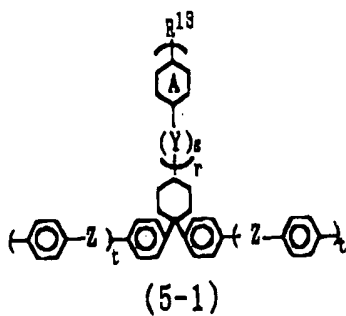
a solvent for dissolving the polymer ingredients so that the varnish composition contains 0.1 to 40% by weight of the polymer ingredient.

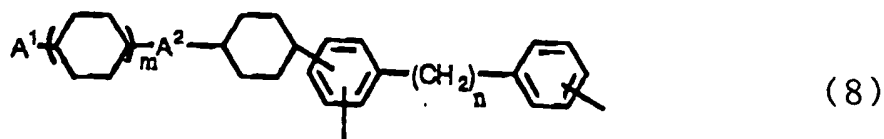
Claim 24 (previously added): The varnish composition of any one of claims 23, 2 or 3 wherein:

R^{13} in formula (2) contains as an essential component a tetravalent organic radical derived from pyromellitic acid or/and a cyclobutanetetracarboxylic acid, and

R^{23} contains:

- a) 1 to 100 mole% of at least one divalent organic radical represented by the following formulas (5-1) to (5-4), (6), (7), or (8):





wherein R^{13} , R^{25} and R^{26} each independently represent hydrogen or an alkyl group of 1 to 12 carbon atoms; Y represents a single bond or CH_2 ; ring A represents a benzene ring or a cyclohexane ring; Z represents a single bond, CH_2 , CH_2CH_2 , or oxygen; r is a positive number of 0 to 3; s is a positive number of 0 to 5; t is a positive number of 0 to 3, provided that when t is 2 to 3, each Z may be the same or different from each other, and further provided that hydrogen on any benzene or cyclohexane ring may be replaced by a lower alkyl group; X^1 represents a single bond, CH_2 , CH_2CH_2 , or oxygen; R^{14} and R^{15} each independently represent hydrogen, an alkyl group or a perfluoroalkyl group of 1 to 12 carbon atoms, at least one of them represents an alkyl group or a perfluoroalkyl group of not less than 3 carbon atoms; u is 0 to 3, provided that when u is 2 to 3, each X^1 may be the same or different from each other, and further provided that hydrogen on any benzene ring may be replaced by a lower alkyl group; X^3 and X^4 each independently represent a single bond, O, COO, OCO, NH, CONH, or $(CH_2)_n$; R^{22} and R^{23} each independently represent a single bond, a group of 1 to 3 rings having an aromatic ring or/and an alicyclic ring or a steroid group, provided that when R^{22} or/and R^{23} have 2 or 3 rings, these rings may be bonded with X^3 and X^4 ; R^{24} represents hydrogen, fluorine, hydrocarbon group, fluorinated hydrocarbon group, an alkoxy group, a cyano group or OH group; A^1 is hydrogen or a straight or branched-chain alkyl group of 1 to 12 carbon atoms in which one methylene or any non-adjacent methylene may be replaced by oxygen; A^2 is a single bond or an alkylene group of 1 to 5 carbon atoms in which one methylene or any non-adjacent methylene may be replaced by oxygen; m is 0 to 3; and n is 1 to 5; the steroid skeleton in formulas (5-2) and (5-3)

may be the one wherein any ring is reduced, enlarged or cleaved, the one wherein it contains a three-membered ring, the one wherein an unsaturated bond in any position is increased or decreased, or the one wherein hydrogen or an alkyl group in any position may be replaced by any monovalent organic group; and

- b) 99 to 0 mole% of at least one of divalent organic radicals represented by the following formula (4), based on the total amount of the divalent organic radical R^{2^*} :



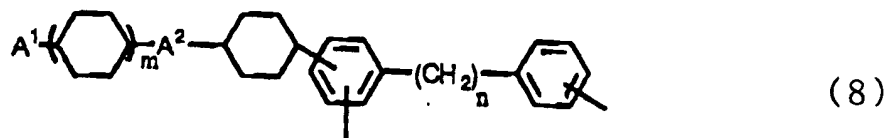
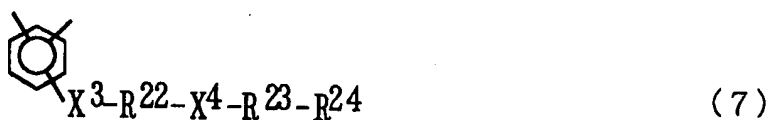
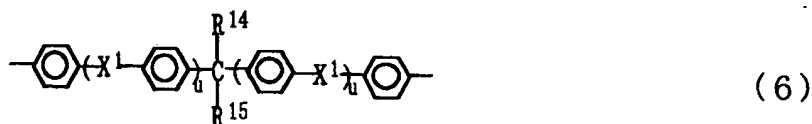
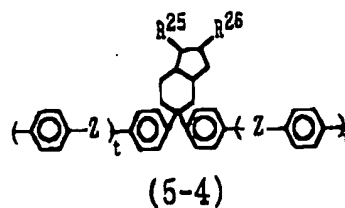
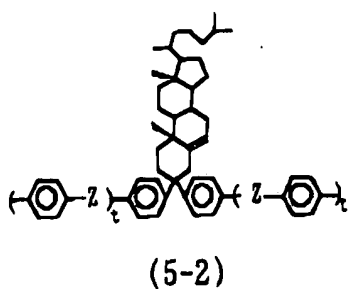
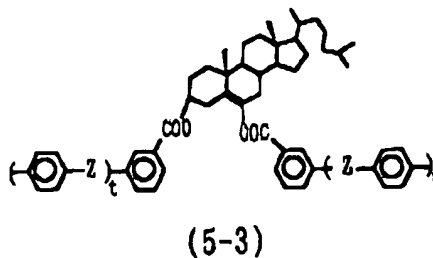
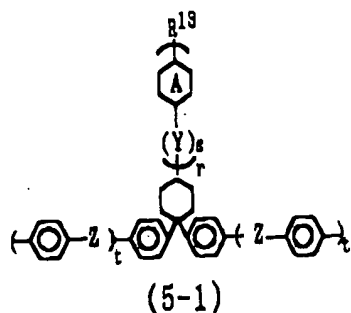
wherein X represents a single bond, CH_2 , CH_2CH_2 , $\text{CH}_2\text{CH}_2\text{CH}_2$, $\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2$, or $\text{C}(\text{CH}_3)_2$; R^9 and R^{10} each independently represent hydrogen or a lower alkyl group; a and b are 1 to 2 respectively; and o is 0 to 3, provided that when o is 2 to 3, each X may be the same or different from each other.

Claim 25 (previously added): The varnish composition of any one of claims 23, 2 or 3 wherein:

R^3 in formula (3) contains as a main component at least one divalent organic radical derived from dicarboxylic acids selected from the group consisting of terephthalic acid, isoterephthalic acid, 1,4-cyclohexanedicarboxylic acid, 4,4'-biphenyldicarboxylic acid, 4,4'-diphenylmethanedi-carboxylic acid, 4,4'-diphenylethanedicarboxylic acid, 4,4'-diphenylpropanedicarboxylic acid, 4,4'-diphenylhexafluoropropanedicarboxylic acid, 2,2-bis(phenyl)propanedicarboxylic acid, 4,4'-terphenyldicarboxylic acid, 2,6-naphthalenedicarboxylic acid, and 2,5-pyridinedicarboxylic acid, and

R^4 contains:

- a) 1 to 100 mole% of at least one divalent organic radical represented by the following formulas (5-1) to (5-4), (6), (7), or (8):



wherein R^{13} , R^{25} and R^{26} each independently represent hydrogen or an alkyl group of 1 to 12 carbon atoms; Y represents a single bond or CH_2 ; ring A represents a benzene ring or a cyclohexane ring; Z represents a single bond, CH_2 , CH_2CH_2 , or oxygen; r is a positive number of 0 to 3; s is

a positive number of 0 to 5; t is a positive number of 0 to 3, provided that when t is 2 to 3, each Z may be the same or different from each other, and further provided that hydrogen on any benzene or cyclohexane ring may be replaced by a lower alkyl group; X^1 represents a single bond, CH_2 , CH_2CH_2 or oxygen; R^{14} and R^{15} each independently represent hydrogen, an alkyl group or a perfluoroalkyl group of 1 to 12 carbon atoms, in which at least one of them represents an alkyl group or a perfluoroalkyl group of not less than 3 carbon atoms; u is 0 to 3, provided that when u is 2 to 3, each X^1 may be the same or different from each other, and further, provided that hydrogen on any benzene ring may be replaced by a lower alkyl group; X^3 and X^4 each independently represent a single bond, O, COO, OCO, NH, CONH, or $(CH_2)_n$; R^{22} and R^{23} each independently represent a single bond, a group of 1 to 3 rings having an aromatic ring or/and an alicyclic ring or a steroid group, provided that when R^{22} or/and R^{23} have 2 or 3 rings, these rings may be bonded with X^3 and X^4 ; R^{24} represents hydrogen, fluorine, hydrocarbon group, fluorinated hydrocarbon group, an alkoxy group, a cyano group or OH group; A^1 is hydrogen or a straight- or branched-chain alkyl group of 1 to 12 carbon atoms in which one methylene or any non-adjacent methylene may be replaced by oxygen; A^2 is a single bond or an alkylene group of 1 to 5 carbon atoms in which one methylene or any non-adjacent methylene may be replaced by oxygen; m is 0 to 3; and n is 1 to 5; the steroid skeleton in formulas (5-2) and (5-3) may be the one wherein any ring is reduced, enlarged or cleaved, the one wherein it contains a three-membered ring, the one wherein an unsaturated bond in any position is increased or decreased, or the one wherein hydrogen or an alkyl group in any position may be replaced by any monovalent organic group; and

b) 99 to 0 mole% of at least one of divalent organic radicals represented by the following formula (4), based on the total amount of the divalent organic radical R^4 , and R^5 and R^6 contain at least one of monovalent organic radicals selected from a lower alkyl group, phenyl, benzyl, cyclohexyl, cyclohexylmethyl, naphthyl, or 9-anthrylmethyl, the percentage of the substitution of which is not less than 80%:



wherein X represents a single bond, CH_2 , CH_2CH_2 , $\text{CH}_2\text{CH}_2\text{CH}_2$, $\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2$ or $\text{C}(\text{CH}_3)_2$; R^9 and R^{10} each independently represent hydrogen or a lower alkyl group; a and b are individually 1 to 2; and o is 0 to 3, provided that when o is 2 to 3, each X may be the same or different from each other.